

CLAIMS

1. A connector (36) for connecting one end of a windshield wiper arm (32a, 32b, 32c) to a first
5 transverse hinge pin (54) belonging to a structure element (38) of a wiper blade unit (30), the connector being of the type having two parallel vertical side cheek plates (66) that are interconnected by a body (68) defining a first recess (78) into which the first
10 hinge pin (54) can be inserted radially, the connector being of the type:

- that is suitable for being received at least in part against the inside end wall of the end (34) of an arm (32a) that belongs to a first category of arm,
15 which end is in the form of a U-shaped hook, via an outside convex cylindrical face portion (74a) of the body (68) and via shapes in relief (78) provided on the facing inside vertical longitudinal faces (66i) of the side cheek plates (66), so that the connector (36) is
20 suitable for being received against the inside end walls of ends (34) of arms (32a) belonging to the first category of arm and of different sizes; and

- that is suitable for receiving a second transverse pin (62) that belongs to a second category
25 of arm (32b) and that extends transversely from a side edge (34a) of the end (34) of the arm (32b) in a second cylindrical recess (84) of the body (68) into which recess the second pin (62) can be inserted transversely, which recess is defined in part by a
30 locking tongue (86) that is elastically deformable and

that extends substantially longitudinally, a first longitudinal end (86a) of which tongue is fastened to the body (68), the locking tongue being suitable for retracting and for enabling the second pin (62) to be
5 inserted, and for causing the second pin (62) to be locked transversely in the position in which it is mounted in the second recess (84);

said connector being characterized in that the second longitudinal end (86b) of the locking tongue
10 (86) is normally connected to the body (68) by a film of material (90), and in that the dimensions of the film (90) are determined so that the second recess (84) is suitable for receiving a second pin (62) that can be of a first or of a second size, the second size being
15 greater than the first size, and inserting a second pin (62) of the second size causes the film of material (90) to break.

2. A connector (36) according to any preceding claim, characterized in that the body (68) includes a
20 front segment (74) that defines the first recess (78), the front outside wall (74a) of the front segment being suitable for being received against the inside end wall of the U-shaped hook of the arm (32a), and a rear segment (76) that extends horizontally above the
25 locking tongue (86), and whose horizontal top face (76s) defines a bearing face for bearing against a top branch (56) of the U-shaped hook, and whose bottom face (76i) is provided with a concave portion (85) that defines in part the second recess (84), in association

with a facing concave portion (88) of the top face (86s) of the locking tongue (86).

3. A connector (36) according to any preceding claim, characterized in that it includes a locking
5 element that is suitable for being received in an annular groove (64) formed in the cylindrical wall of a second pin (62) of the first size or of the second size for locking the second pin (62) transversely in the position in which it is mounted in the second recess
10 (84).

4. A connector (36) according to the preceding claim, characterized in that the locking tongue (86) exerts a resilient locking force on the second pin (62) so as to prevent the locking element from disengaging
15 from the annular groove (64).

5. A connector (36) according to claim 3 or claim 4, characterized in that the locking element consists of a lug (92) that is carried by the locking tongue (86).

20 6. A connector (36) according to the preceding claim, characterized in that the second longitudinal end (86b) of the locking tongue (86) is extended by a control tab (94) for releasing the second pin (62).

25 7. A connector (36) according to claim 3 or claim 4, characterized in that the locking element consists of a lug that is carried by the body (68).

8. A connector (36) according to claim 3 or claim 4, characterized in that the locking element consists of a second tongue (114) that is elastically deformable
30 and that extends substantially longitudinally forwards

from the front longitudinal end (76a) of the rear segment (76) of the body (68), which tongue is suitable for retracting upwards to enable the second pin (62) to be inserted, and is suitable for being received at least in part in the peripheral groove (64) in the second pin (62) so as to lock the second pin (62) transversely, in association with the locking tongue (86).

9. A connector (36) according to the preceding claim, characterized in that the second tongue (114) has transverse width complementary to the width of the annular groove (64) in the second pin (62).

10. A connector (36) according to any one of claims 2 to 9, characterized in that the front longitudinal end (86a) of the locking tongue (86) is fastened to the front segment (74).

11. A connector (36) according to any one of claims 2 to 10, characterized in that the body (68) also includes a rear bottom segment (98) having a front face (98a) that is provided with a rib (100) which is suitable for co-operating with the releasing tab (94) so as to hold the locking tongue (86) in a position in which the second recess (84) is open.

12. A connector according to the preceding claim, characterized in that the rear bottom segment (98) has a bottom bearing face (98i) for bearing against a top face (60s) of a horizontal bottom segment (60) of the end (34) of an arm (32a) belonging to the first category of arm.

13. A connector (36) according to any preceding claim, characterized in that it is suitable for receiving the end (34) of a third category of arm (32c), which end consists in a shaped-section member
5 segment that extends substantially longitudinally forwards, in a third cylindrical recess (102) of longitudinal major axis, and that is open in its rear face.

14. A connector (36) according to the preceding
10 claim, characterized in that the third recess (102) is formed in a separate part (104) mounted on the connector (36) and that is suitable for being fastened to the connector (36) by co-operation between complementary shapes (106, 108).

15 15. A connector (36) according to any one of claims 2 to 13, characterized in that the front segment (74) of the body (68) is provided with a notch (110) that is of longitudinal axis, that is open in its rear face, and that forms the front end of the third recess
20 (102), and in that the bottom face (76i) of the rear segment (76) and the top face (98s) of the rear bottom segment (98) of the body (68), in combination with the inside vertical longitudinal faces of the side cheek plates (66), define a rear segment of the third
25 recess (102).

16. A connector (36) according to any preceding claim, in combination with claim 2, characterized in that the end (34) of an arm (32c) belonging to the third category of arm is provided with a lug (65) which
30 projects upwards relative to the top face (34s) of the

end (34) of the arm (32c), and which is suitable for being received in a vertical orifice (96) of the rear segment (76) for longitudinally locking the end (34) of the arm (32c) in the position in which it is mounted in the third recess (102).

17. A connector (36) according to any preceding claim, characterized in that a portion (86i) of the locking tongue (86) is curved downwards so that, for at least one size of arm (32a) belonging to the first category of arm, and when the arm (32a) is in the assembled position, the film of material (90) is broken and the locking tongue (86) is deformed elastically upwards so as to exert a substantially vertical force downwards on the top face (60s) of a horizontal bottom segment (60) of the end (34) of the arm (32a).

18. A connector according to the preceding claim, characterized in that, for at least a second size of arm (32a) belonging to the first category of arm, the film of material connects the second longitudinal end (86b) of the locking tongue (86) to the body (68), so as to exert a substantially vertical force downwards on the top face (60s) of a second horizontal bottom segment (60) of the end (34) of the arm (32a).

19. A connector (36) according to any preceding claim, characterized in that the side edges of the locking tongue (86) are extended transversely outwards by rounded projections (122).

20. A connector (36) according to any one of claims 7 to 19, characterized in that the second tongue (114) is provided with two side studs (116) disposed on

either side of the front longitudinal end (114a) of the second tongue (114), which studs extend transversely towards the outside of the connector (36) and pass through respective orifices (84) in the associated side cheek plates (66) so that the free end of each stud (116) comes flush with the outside vertical face (66e) of the associated cheek plate (66).

21. A connector (36) according to the preceding claim, characterized in that, when an arm (32c) belonging to the third category of arm is in the position in which it is mounted in the third recess (102), each of the side studs (116) is in vertical abutment against a top edge (82a) of the orifice (82) of the associated cheek plate (66).

22. A connector (36) according to any one of claims 7 to 21, characterized in that the free front end (114a) of the second tongue (114) is curved back downwards so that the end (34) of an arm (32c) belonging to the third category of arm is inserted into the third recess (102), the second tongue (114) is deformed elastically upwards, and the free front end (114a) of the second tongue (114) exerts a return force directed substantially downwards on the top face (34s) of the end (34) of the arm (32c).

23. A connector (36) according to any one of claims 7 to 22, characterized in that the free front end (114a) of the second tongue (114) is extended upwards by a finger (118) so that when the end (34) of an arm (32a) belonging to the first category of arm is in the assembled position, the second tongue (114) is

deformed elastically downwards and acts via the finger (118) to exert a return force directed substantially upwards on a bottom face (56i) of a horizontal top first segment (56) of the end (34) of the arm (32a).

5 24. A connector (36) according to any preceding claim, characterized in that the front end segment (66a) of each cheek plate (66), which segment extends cantilevered out forwards from the body (68), is elastically deformable and, on its inside vertical
10 longitudinal face (66i), is provided with a ramp-forming abutment (80) so as to retract when the end (34) of an arm (32a) belonging to the first category of arm is inserted, and so as to lock the U-shaped hook in the position in which it is mounted around the body
15 (68) of the connector (36).

 25. A connector (36) according to the preceding claim, characterized in that the ramp-forming abutment (80) extends over a top portion of the front end segment (66a) of the associated cheek plate (66), and
20 in that a bottom portion of the front end segment (66a) is provided with an opening (81) for insertion of the U-shaped hook.

 26. A connector (36) according to any preceding claim, in combination with claim 2, characterized in
25 that the shapes in relief (78) comprise a rib (78a) provided on the inside vertical longitudinal face (66i) of each side plate (66) of the connector (36), which rib extends longitudinally above the top face (76s) of the rear segment (76) of the body (68) for positioning

the end (34) of an arm (32a) belonging to the first category of arm.

27. A connector (36) according to the preceding claim, characterized in that the ribs (78a) are formed
5 so that each of their top faces forms a vertical bearing surface for the top branch (56) of the U-shaped hook having at least a first size of arm, and so that their facing vertical faces transversely position the top branch (56) of the U-shaped hook of an arm (32a) of
10 a second size.

28. A connector (36) according to any preceding claim, in combination with claim 2, characterized in that the shapes in relief further comprise a second projection (78b) disposed vertically below the body
15 (68) so as to perform, at least in part, the positioning of the connector (36) against the inside end wall of the end (34) of an arm (32a) belonging to the first category of arm.

29. A connector (36) according to the preceding
20 claim, characterized in that the second projection (78b) is formed so that its top face vertically positions the connector (36) for a first size of arm (32a), its bottom face vertically positions the connector (36) for a second size of arm (32a), and its
25 inside vertical face transversely positions the connector (36) for a third size of arm (32a).

30. A connector (36) according to any preceding claim, characterized in that the bottom face of the locking tongue (86) is provided with ribs (124) for

vertically and/or transversely positioning an arm (32a) of the first category and of at least one size.

31. A connector (36) according to the preceding claim, characterized in that each positioning rib (124)
5 extends substantially vertically downwards along a side edge of the bottom face (86i) of the locking tongue (86)..

32. A connector (36) according to any preceding claim, in combination with claim 19, characterized in
10 that the projections (122) of the locking tongue (86) extend transversely so that the free transverse end of each projection (122) comes flush with the outside vertical face (66e) of the associated cheek plate (66).

33. A connector (36) according to the preceding
15 claim, characterized in that each projection (122) is curved so that the curvature of its top face (122s) is substantially complementary to the outside cylindrical wall of a second pin (62) of the second size.

34. A connector (36) according to the preceding
20 claim, characterized in that the curvature of a top edge of the opening (82) is substantially identical to the curvature of the outside cylindrical wall of a second pin (62) of the second size.

35. A connector (36) according to any preceding
25 claim, in combination with claim 20, characterized in that each of the side studs (116) has a bearing surface for bearing against the outside cylindrical surface of a second pin (62) of the second size, which bearing surface is complementary to said outside cylindrical
30 wall.

36. A connector (36) according to any preceding claim, characterized in that each cheek plate (66) is provided with a notch (126) which extends vertically downwards from the top edge of the associated cheek
5 plate (66) and which is complementary to a manipulator element for manipulating the connector (36).

37. A connector (36) according to the preceding claim, in combination with claim 2, characterized in that the notch (126) substantially forms an upside-down
10 T-shape in which the bottom edge of the horizontal branch extends vertically above the top face 74s) of the front element (74) of the body (68) of the connector (36).

38. A connector (36) according to the preceding
15 claim, in combination with claim 26, characterized in that the ribs (78a) extend longitudinally forwards so as to extend to the front end of the front segment (74) of the body (68) of the connector.